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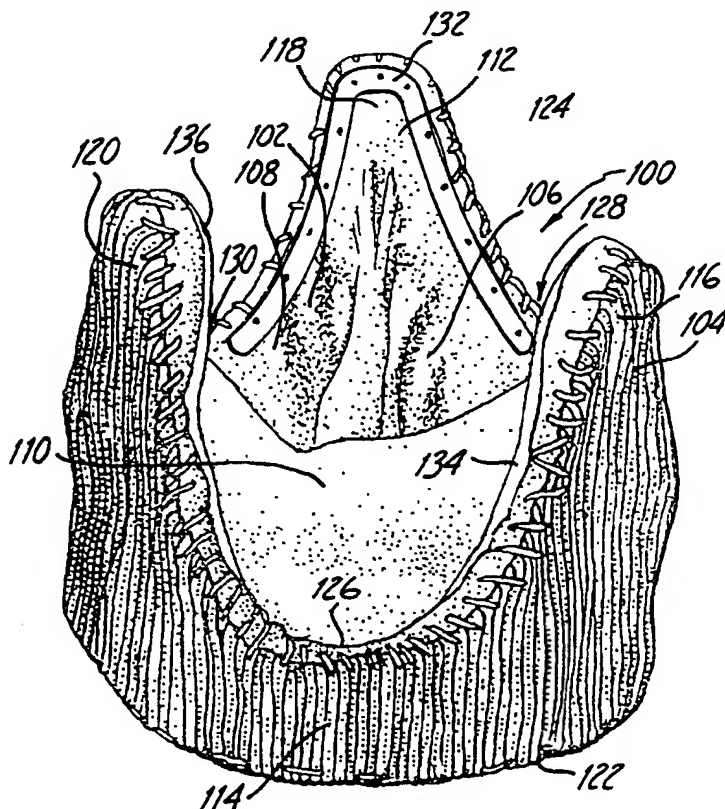
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[Continued on next page]

(54) Title: HEART VALVE PROSTHESES



(57) Abstract: Tools can be used to assist with the implantation of heart valve prostheses, especially stentless aortic heart valve prostheses. In some embodiments, a heart valve prosthesis (100) includes a plurality of flexible leaflets (106, 108, 110), a commissure support (116, 118, 120) and a plurality of fasteners (140) inserted into the inner surface of the commissure support (116, 118, 120) and protruding from the outer surface of the commissure support (106, 108, 110). The fasteners (140) comprise an elongated portion (142) and a tip (144) at an end of the elongated portion (142). In other embodiments, a heart valve prosthesis (100) includes a plurality of flexible leaflets (106, 108, 110) and a reinforcement (132) secured to an inner surface of a valve commissure support (118). The reinforcement (132) has an aperture (258). The heart valve prosthesis (100) and fastener components (140, 132) can be placed into kits. The fasteners can be used to perform improved implantation procedures.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/11616

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 A61F2/24

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 98 43556 A (BAXTER INTERNATIONAL, INC.) 8 October 1998 (1998-10-08) abstract; figures	1,18
A	US 5 370 685 A (STEVENS) 6 December 1994 (1994-12-06) column 8, line 41 -column 9, line 46; figures 11-15	1,18
A	US 5 855 601 A (BESSLER ET AL) 5 January 1999 (1999-01-05) column 5, line 52 -column 6, line 2; figures 6,7	1,18
A	DE 195 32 846 A (BERG) 13 March 1997 (1997-03-13)	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

\* Special categories of cited documents :

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

31 August 2000

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Name and mailing address of the ISA

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Authorized officer

Smith, C

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 00/11616

## Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 20-27  
because they relate to subject matter not required to be searched by this Authority, namely:  
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
1-13, 18, 19

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-13,18,19

A heart valve prosthesis with fasteners

2. Claims: 14-17

A heart valve prosthesis with a reinforcement

3. Claims: 28,29

A fastener applicator for implanting a heart valve prosthesis

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/11616

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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